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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,973	06/09/2005	Bernhard Gutsche	C 2745 PCT/US	6953
23657 7590 09/03/2008 FOX ROTHSCHILD LLP 1101 MARKET STREET PHILADELPHIA, PA 19107				
EXAMINER OH, TAYLOR V				
ART UNIT		PAPER NUMBER		
1625				
MAIL DATE		DELIVERY MODE		
09/03/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/537,973

**Applicant(s)**

GUTSCHE ET AL.

**Examiner**

Taylor Victor Oh

**Art Unit**

1625

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13-23, 25 and 26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-23, 25 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/9/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

Applicant's arguments with respect to claims 13-23, 25-26 have been considered but are moot in view of the new ground(s) of rejection.

The Status of Claims:

Claims 13-23, 25-26 are pending.

Claims 13-23, 25-26 are rejected.

**DETAILED ACTION**

1. Claims 13-23, 25-26 are under consideration in this Office Action.

**Priority**

2. It is noted that this application is a 371 of PCT/EP03/13563 (12/02/2003) , which has a foreign priority document, Germany 10257525.8 (12/10/2002).

**Drawings**

3. The drawing filed on 6/09/2005 is accepted by the examiner.

***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 13-23, 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kahsnitz et al (US 5,177,229) in view of Bremus et al (US 5,008,046) and Aslam et al (Kirk –Othermer Encyclopedia of Chemical Technology, vol. 10, 12/4/2000, p.477).

Kahsnitz et al discloses the process for the preparation of ester in the followings (see abstract):

Alcohols and acids are esterified by means of liquid-phase equilibrium reactions on ion exchangers in an apparatus comprising a prereactor and a rectifying column with external reactors. The process is characterized by the fact that a portion of one of the starting compounds is fed directly to the external reactors.

Due to the limited thermal stability of the acidic ion exchangers, esterification in the prereactor and in the external reactors is conducted at temperatures up to about 120° C. In so doing temperatures ranging from 40° to 100° C. are preferably used.

(see col. 3, lines 14-

18).

The instant invention, however, differs from the prior art in that the subsequent esterification reaction between the fatty acids and alkanols takes place using a reaction column in the presence of the catalyst after the initial esterification; the claimed process is a counter current and continuous process.

Bremus et al discloses the following esterification process (see col. 3, lines 2-

15):

component of the process is a reaction column 1, comprising a plurality of bubble plates, surmounted by the rectifying section 2. The catalyst or catalyst solution, optionally after heating, is delivered through a pipe 3 to the uppermost plate of the reaction column 1, as is the fatty acid (through a pipe 4), the fatty acid being heated by means of a heat exchanger 5 before delivery to the reaction column. The fresh alkanol is delivered through a pipe 6 to a second heat exchanger 7, superheated and directly introduced into the reaction column 1 through a pipe 8 immediately above the sump of the column. Fresh alkanol refers to alkanol which has not been recycled through the process.

Furthermore,

In another preferred embodiment of the invention, the esterification is carried out at a temperature at the top of the reaction column of at most 190° C. and more preferably in the range from 120° C. to 145° C. These esterification temperatures which are low by comparison with conventional processes lead in particular to a reduction in the necessary energy costs of the process. (see col. 2 ,lines 25-31).

Furthermore, Aslam et al discloses the use of the various catalysts in the esterification process as shown below (see page 477, from the middle to the last paragraph) :

**2.5. Catalysts.** The choice of the proper catalyst for an esterification reaction is dependent on several factors (43-46). The most common catalysts used are strong mineral acids such as sulfuric and hydrochloric acids. Lewis acids such as boron trifluoride, tin and zinc salts, aluminum halides, and organo-titanates have been used. Cation-exchange resins and zeolites are often employed also.

In laboratory preparations, sulfuric acid and hydrochloric acid have classically been used as esterification catalysts. However, formation of alkyl chlorides or dehydration, isomerization, or polymerization side reactions may result. Sulfonic acids, such as benzenesulfonic acid, *p*-toluenesulfonic acid, or methanesulfonic acid, are widely used in plant operations because of their less corrosive nature. Phosphoric acid is sometimes employed, but it leads to rather slow reactions. Soluble or supported metal salts minimize side reactions but usually require higher temperatures than strong acids.

**Acid-Regenerated Cation Exchangers.** The use of acid-regenerated cation resin exchangers (see ION EXCHANGE) as catalysts for effecting esterification offers distinct advantages over conventional methods. Several types of cation-exchange resins can be used as solid catalysts for esterification (47,48). In general, the strongly acidic sulfonated resins comprised of copolymers of styrene, ethylvinylbenzene, and divinylbenzene are used most widely. With the continued improvement of ion-exchange resins, such as the macroporous sulfonated resins, esterification has become one of the most fertile areas for use of these solid catalysts. With low molecular weight acids and alcohols, in most cases the resin structure has minimal effect on the yield or kinetics of the esterification as long as the catalyst contains strongly acidic groups. The kinetics in batch and tubular reactors of the esterification of 1-butanol with acetic acid catalyzed by a macroporous sulfonated polystyrene exchange resin have been studied. The catalytic activity was dependent on the water content of the resin and the rate determining step is the surface reaction of the chemisorbed acid and adsorbed alcohol (49).

Kahsnitz et al expressly the process of preparing esters from alcohols and acids by means of liquid phase reactions on ion exchangers in the prereactor and rectifying column along with external reactors; similarly, Bremus et al does disclose the use of the reaction column in countercurrent contact for the continuous esterification process.

Furthermore, Aslam et al does point out that there is an equivalence between the homogeneous catalyst and the heterogenous catalyst with respect to their usage in the esterification process. Both processes are commonly involved in the esterification under a similar reaction such as a similar reaction temperature. Bremus et al does emphasize that a low esterification temperature in the use of the reaction column leads to a reduction in the necessary energy costs of the process. Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the Bremus's et al reaction column in countercurrent contact for the continuous esterification process in combination of the teaching of the equivalency between the homogeneous catalyst and the heterogenous catalyst of Aslam et al in the Kahsnitz et al process in order to reduce the cost of the operation in the prior art process. This is because the skilled artisan in the art would expect or predict such a combination to be feasible and successful as guidance shown in the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres can be reached on 571-272-0867. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Taylor Victor Oh, MSD,LAC  
Primary Examiner  
Art Unit: 1625

/Taylor Victor Oh/

Primary Examiner, Art Unit 1625

8/30/08